THE EPIDEMIOLOGY AND MAGNITUDE OF CHARITY CARE DELIVERED BY IOWA HOSPITALS

Report to the:

RESEARCH ADVISORY COUNCIL OF THE IOWA LEGISLATIVE COMMISSION ON AFFORDABLE HEALTH CARE PLANS FOR SMALL BUSINESSES AND FAMILIES

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PROJECT OBJECTIVES

An important issue in assessing the economic impact of broadening health care coverage for Iowans is the type of health care and the amount of care provided to patients who lack insurance, the great majority of which is written off by providers as charity care. This care is delivered by a wide spectrum of clinicians, including physicians, nurses, pharmacists, dentists, chiropractors, and podiatrists in an equally broad spectrum of settings (e.g., acute care hospitals, rehabilitation and skilled care facilities, emergency rooms, government supported clinics, community-based free clinics, providers' offices). A large proportion (and likely a large majority) of this care is provided by hospitals through acute hospitalizations, ambulatory surgeries, and emergency room visits.

This project sought to quantify the care delivered in these settings. These settings were chosen for two primary reasons. First, hospital-based care represents a substantial portion (and likely a large majority) of the health care provided to patients without health insurance. Second, information on hospital-based health care encounters is readily available in a standardized format from the Iowa Hospital Association. This centralized repository obviates the need to obtain data from individual health care providers and to develop individual data use agreements. In contrast, the lack of a centralized repository for care provided in other health care delivery settings (e.g., physicians', dentists', or chiropractors' offices, community-based clinics, free clinics) would make assessment of the care to uninsured patients substantially more challenging and costly.

This specific aims of this project were to:

- Determine the amount and cost of care provided by Iowa hospitals to Iowa residents without health insurance in three settings:
  - Acute care units
  - Emergency rooms
  - Hospital-based ambulatory surgery centers

- Characterize the patient population without insurance receiving hospital-based care, relative to patients with health insurance.

METHODS

Descriptions of the data utilized for this project, the patient populations that were studied, the variables used in the analysis, and the analyses undertaken to meet the objectives of the project are described below.

Data

The project utilized several complementary sources of data.

- Iowa Hospital Association files of all acute care hospitalizations in Iowa hospitals for the six-year period 2001-2006 (with the exception of hospitalizations for HIV infection and substance abuse treatment and most hospitalizations for mental health conditions). Data elements include: demographic information; source of admission (e.g., physician referral, emergency room); admission and discharge dates; patients' zip code and county of residence; primary and secondary diagnoses and procedures, as captured by ICD-9-CM codes; DRG; discharge disposition and destination; total hospital charges; and a unique facility identifier.
- Iowa Hospital Association files of all emergency room visits of patients who were not admitted for hospitalization to the same facility for the two-year period 2005-06. Data elements are generally similar to data available in the acute care hospitalization file.
- Iowa Hospital Association files of all ambulatory surgeries in hospital-based ambulatory surgery centers for the two-year period 2005-06. Data elements are again generally similar to data in the acute care hospitalization file.
- Medicare cost reports for all Iowa hospitals for the years 2001-2006. Data elements utilized in the files included summary measures of total hospital charges and total costs.
- American Hospital Association Annual Hospital Survey Data for all Iowa hospitals for the years 2001-06. Data elements include hospital characteristics (e.g., teaching status, hospital ownership, critical access status).

Patients

The eligible study population included all Iowa residents in the three Iowa Hospital Association files. The eligible populations included 1,889,891 patients with acute care hospitalizations during 2001-06, 1,642,415 patients with emergency room (ER) visits during 2005-06, and 751,467 patients undergoing ambulatory surgeries in 2005-06. Patients for whom the payer source was listed as "no charge" were also excluded. These exclusions totaled 2,280 (0.12%) acute hospitalizations, 1,057 (0.06%) ER visits, and 3,155 (0.42%) ambulatory surgeries, resulting in final analytical samples of 1,887,611 acute hospitalizations, 1,641,358 ER visits, and 748,312 ambulatory surgeries.

Variables

Descriptions of key project variables are provided below:

- Demographics included: age, gender, and race.

- County and zip code of residence. Patients not residing in Iowa were excluded from analysis.
- Type of health insurance was based on the "source of pay" variable and was categorized into the following five groups: 1) self-pay (i.e., uninsured); 2) Medicare (includes Medicare Title 18 and Medicare managed care); 3) Medicaid (includes Medicaid Title 19 and Medicaid managed care); 4) other government (includes other state programs, county programs, and Workers Compensation); and 5) Blue Cross and Commercial (includes HMO, PPO, and ODS).
- Source of admission (for hospitalized patients) included 11 mutually exclusive groups, including "Physician Referral", "ER", "Transfer from a Different Hospital", "Clinic Referral", "Transfer from another Health Care Facility", "HMO Referral", "Transfer from a Skilled Nursing Facility", "Court/Law Enforcement", "Transfer from Hospital Inpatient in Same Facility", "Transfer from Critical Access Hospital", and "Information not Available". For the purposes of analysis, the categories "Transfer from a Different Hospital", "Transfer from another Health Care Facility", Transfer from a Skilled Nursing Facility" and "Transfer from a Critical Access Hospital" were collapsed into a new category: "Transfer from Another Healthcare Facility". The categories "Clinic Referral" and "HMO Referral" were collapsed into a new category: "Clinic/HMO Referral". The categories "Court/Law Enforcement", "Transfer from Hospital Inpatient in Same Facility" and "Information not Available" were collapsed into a new category: "Other/Information not Available".
- Diagnosis was classified using several different taxonomies. For acute hospitalizations, patients were categorized into diagnosis related groups (DRGs), Major Diagnostic Categories (which aggregate the roughly 500 DRGs into 25 broader service categories). For ER visits, patients were categorized in 259 mutually exclusive diagnostic categories, on the basis of their principal ICD-9-CM primary diagnosis codes, using the Clinical Classifications Software (CCS). The CCS is a diagnosis categorization scheme designed to collapse more than 13,600 ICD-9-CM diagnosis codes into homogeneous groups. The CCS was developed by the Agency for Healthcare Research and Quality and software for assigning ICD9-CM codes to CCS categories is available through the AHRQ web-site. For ambulatory surgeries, patients were categorized into 259 mutually exclusive procedures using the procedure version of the AHRQ Clinical Classifications Software, which classifies patients using ICD-9-CM procedure codes.
- Length of Stay (for hospitalized patients only) was based on the total number of days spent in the hospital (i.e., discharge date – admission date + 1). Length of stay was truncated at 90 days to decrease the impact of the small numbers of outliers (0.08%) with excessively long lengths of stay.
- Total charges. Excessively low charges (less than $100 for acute hospitalizations, less than $50 for ambulatory surgeries, and less than $20 for ER visits) were coded as missing. Charges were truncated to decrease the impact of the small numbers of outliers with excessively high charges, using the following thresholds: $339,392 for acute hospitalizations (0.08% of hospitalizations), $15,000 for ER visits (0.11% of visits), and $50,000 for ambulatory surgeries (0.15% of surgeries).
- Hospital global cost / charge ratios were based on dividing total cost information by total charge information from Worksheet C, Part 1 in the CMS Hospital Cost Reports for 2001-06. Because of incomplete data in these reports, the following steps were taken. First,

excessively low cost/charge ratios (i.e., less than 0.25) were converted to missing. Second, valid values for all years in each hospital were averaged to provide a mean cost/charge ratio for the hospital. Third, for the eight hospitals, which had no valid cost/charge ratios for any of the six years of analysis, the mean cost/charge ratio for all Iowa hospitals (0.64) was used.

- Hospital costs were based on multiplying the total charges associated with an encounter by the cost/charge ratio for the hospital providing care.
- Hospital complications were measured using the AHRQ Patient Safety Indicators. The indicators are determined from algorithms based on ICD-9-CM diagnosis and procedure codes and included: Complications of Anesthesia, Death in Low Mortality DRGs, Decubitus Ulcer, Failure to Rescue, Foreign Body Left in During Proc, Iatrogenic Pneumothorax, Infection due to Medical Care, Postoperative Hip Fracture, Postoperative Hemorrhage or Hematoma, Postoperative Physiological Metabolic Derangement, Postoperative Respiratory Failure, Postoperative PE or DVT, Postoperative Sepsis, Postoperative Wound Dehiscence, Accidental Puncture/Laceration, Transfusion Reaction, Neonatal Birth Injury, Obstetrical Vaginal Trauma Related to Instrumentation, Obstetrical Vaginal Trauma Unrelated to Instrumentation, and Obstetrical Vaginal Trauma Related to Cesarean Section Delivery. Although the validity and reliability (i.e., the degree to which the indicators accurately measure each of the complications) of the AHRQ Patient Safety Indicators have not been definitively established, the indicators are included in the report, given their wide use nationally and the recent release of such data by the Iowa Healthcare Collaborative.
- Hospital characteristics were obtained from the American Hospital Association Annual Surveys and included the following: 1) critical access status; 2) major teaching hospital; and 3) hospital ownership (categorized into Church, Government, Other Not-For-Profit.
- Discharge destination (for hospitalized patients) included 20 mutually-exclusive categories. For the purposes of analysis, these categories were collapsed into seven groups: 1) Home or Self Care; 2) Acute Care Hospital (*includes the categories, "Short-term General Hospital", "Federal Hospital", "Medicare-Approved Swing Bed", "Critical Access Hospital" and "Psychiatric Hospital or Unit"*); 3) Other Inpatient Care Facility (*includes the categories, "Skilled Nursing Facility", "Intermediate Care Facility", "Inpatient Rehabilitation Facility", "Nursing Facility", "Long-Term Care Hospital", "Hospice–Home" and "Hospice–Medical Facility"*); 4) "In-hospital Mortality; 5) Home Health Provider (*includes the categories, "Care of Home Health Organization" and "Care of Home IV Provider"*); 6) Left Against Medical Advice; and 7) Other/Unknown (*includes the categories, "Another Type of Institution", "Admitted as Inpatient at this Facility" and "Reserved for National Assignment"*).

Analysis

Separate analyses were conducted for acute hospitalizations, ER visits, and ambulatory surgery patients. For all three types of encounters, analyses examined the following areas:

- Total number of encounters for patients with different types of health insurance and without health insurance for all years and for individual years, highlighting potential trends over time.
- Percent of all encounters that involved care of uninsured patients for all years and individual years.

- Total number of encounters in uninsured patients by county of residence and the percent of all encounters in the county by uninsured patients.
- Differences in the proportions of uninsured patients by type of hospital.
- Demographic characteristics and admission source of patients without insurance, compared to patients with insurance.
- Most common diagnoses of patients without health insurance.
- Mean length of stay (hospitalized patients only), total charges, and total costs of patients without health insurance compared to patients with insurance.
- Differences in length of stay, charges, and costs in uninsured and insured patients, adjusting for differences in age, race, and gender, and diagnosis using multivariable linear regression analysis.
- Total costs attributable to the care of patients without insurance.

In addition to the analyses above, five additional analyses were conducted in hospitalized patients, including:

- Rates of uninsured hospital patients in Iowa in 2003, compared to rates in 10 other states (AZ, CA, FL, MA, MD, NC, NJ, TX, WA, and WI) for which HCUP state inpatient data was available through the Center for Research in the Implementation of Innovative Strategies in Practice at the Iowa City VA Medical Center.
- Rates of hospital complications in hospital admissions without insurance, compared to admissions with insurance.
- Rates of in-hospital mortality in insured and uninsured patients.
- Rates of in-hospital mortality in insured and uninsured patients, adjusting for differences in age, race, and gender, and diagnosis using multivariable logistic regression analysis.
- Rates of discharge to specific destinations of admissions without insurance, compared to admissions with insurance.

RESULTS

Characteristics of patients with and without insurance for the three patient groups (acute hospitalizations, ER visits, and ambulatory surgeries are shown in Table 1, below. As shown in the table patients without insurance were more likely to be male than patients with insurance, were less likely to be white and more likely to be black, and were younger.

Table 1) Characteristics of Patients with and without Health Insurance

	Acute Hospitalizations (2001-2006)		ER Visits (2005-2006)		Ambulatory Surgeries (2005-2006)	
	Insurance		Insurance		Insurance	
	No	*Yes*	*No*	*Yes*	*No*	*Yes*
Number of Patients	70,676	1,816,935	215,243	1,426,115	13,744	734,568
Gender						
- Male, %	49.9%	40.2%	51.6%	45.2%	47.2%	43.9%
- Female, %	50.1%	59.8%	48.4%	54.8%	52.8%	55.1%
Mean Age (SD), in years	32.6 (22.4)	51.1 (29.5)	30.1 (14.7)	37.7 (26.6)	41.1 (17.8)	53.3 (22.4)
Race						
White	65.9%	73.0%	66.8%	75.4%	70.4%	78.6%
Black	4.7%	2.1%	8.3%	4.6%	3.2%	1.5%
Asian	0.6%	0.4%	0.3%	0.4%	0.5%	0.4%
American Indian or Alaska Native	0.5%	0.2%	0.5%	0.3%	0.4%	0.2%
Other/Unknown	28.4%	24.4%	24.0%	19.4%	25.6%	19.4%
Admission Source *(Hospitalizations only)*						
Physician Referral	44.5%	54.4%				
ER	41.8%	33.4%				
Clinic/HMO Referral	4.3%	3.5%				
Transfer from Another Healthcare Facility	4.1%	4.1%				
Other/Information not Available	5.3%	4.6%				

Types of health insurance for the three patient populations are shown in Table, 2, below. Medicare was the most common type of insurance for acute hospitalizations, while Blue Cross/Other Commercial was the most common insurance of ER visits, and ambulatory

surgeries. Uninsured patients comprised roughly 4% of acute hospitalizations, 13% of emergency room visits, and 2% of ambulatory surgeries.

Table 2) Total Number and Percent of Encounters by Insurance Type

	Acute Hospitalizations (2001-2006)		ER Visits (2005-2006)		Ambulatory Surgeries (2005-2006)	
	Number of Patients	***Percent of All Patients***	***Number of Patients***	***Percent of All Patients***	***Number of Patients***	***Percent of All Patients***
Blue Cross / Other Commercial	722,631	38.3%	670,555	40.9%	382,057	51.1%
Medicare	830,364	44.0%	348,570	21.2%	274,708	36.7%
Medicaid	234,213	12.4%	337,579	20.6%	55,237	7.4%
Other Government	29,727	1.6%	69,411	4.2%	22,566	3.0%
Uninsured	70,676	3.7%	215,243	13.1%	13,744	1.8%

Tables 3A and 3B show these insurance breakdowns for individual years for each of the three study groups. For acute hospitalizations, the absolute number of admissions without insurance tended to decline over time – from 13,179 in 2001 to 11,953 in 2006, while the proportion of admissions without insurance was relatively stable.

Table 3A) Total Number and Percent of Acute Hospitalizations by Insurance Type for Individual Years

	2001	2002	2003	2004	2005	2006
	---------- *Number (Percent) of All Hospitalizations* ----------					
Blue Cross / Other Commercial	127,420 (39.5%)	123,775 (38.8%)	122,762 (39.0%)	118,313 (38.0%)	116,911 (37.1%)	113,450 (37.3%)
Medicare	144,379 (44.7%)	141,556 (44.4%)	137,960 (43.8%)	137,703 (44.2%)	138,697 (44.0%)	130,069 (42.7%)
Medicaid	32,789 (10.2%)	35,727 (11.2%)	37,753 (12.0%)	39,110 (12.6%)	44,360 (14.1%)	44,474 (14.6%)
Other Government	5,029 (1.6%)	5,280 (1.7%)	5,611 (1.8%)	5,385 (1.7%)	4,035 (1.3%)	4,387 (1.4%)
Uninsured	13,179 (4.1%)	12,869 (4.0%)	10,602 (3.4%)	11,021 (3.5%)	11,052 (3.5%)	11,953 (3.9%)

Table 3B) Total Number and Percent of ER Visits and Ambulatory Surgeries by Insurance Type for Individual Years

ER Visits	2005	2006	Ambulatory Surgeries	2005	2006
	---- Number (%) -----			---- Number (%) -----	
Blue Cross / Other Commercial	338,674 (41.5%)	331,881 (40.2%)	**Blue Cross / Other Commercial**	202,262 (51.0%)	179,795 (51.1%)
Medicare	171,296 (21.0%)	177,274 (21.5%)	**Medicare**	146,692 (37.0%)	128,016 (36.4%)
Medicaid	167,443 (20.5%)	170,136 (20.6%)	**Medicaid**	27,028 (6.8%)	28,209 (8.0%)
Other Government	31,665 (3.9%)	37,746 (4.6%)	**Other Government**	12,705 (3.2%)	9,861 (2.8%)
Uninsured	106,275 (13.0%)	108,968 (13.2%)	**Uninsured**	7,748 (2.0%)	5,996 (1.7%)

Table 4 compares the proportion of hospitalizations without insurance in Iowa in 2003 (3.4%) to the proportions in 10 other states. Four states had a lower proportion, while six states had a higher proportion.

Table 4) Percent of All Hospitalizations Occurring in Uninsured Patients for 2003 in Iowa and in 10 Other States

State	Percent	State	Percent	State	Percent
MA	2.1%	IA	3.4%	NC	5.7%
AZ	2.7%	WI	3.6%	TX	7.0%
WA	2.7%	MD	4.3%	NJ	9.8%
CA	3.1%	FL	5.6%		

Tables 5A, 5B, and 5C show the total number of patients without insurance residing in individual counties and the proportions of encounters of acute hospitalizations, emergency room visits, and ambulatory surgeries by residents in each county without insurance.

Table 5A) Total Number and Percent of All Hospitalizations by Uninsured Patients during 2001-2006 by County of Residence

County	Number	Percent	County	Number	Percent
Adair	125	2.2%	Jefferson	242	2.9%
Adams	139	4.4%	Johnson	1,477	3.0%

Allamakee	399	7.8%	Jones	186	1.6%
Appanoose	368	3.1%	Keokuk	253	3.2%
Audubon	140	3.4%	Kossuth	225	2.6%
Benton	371	2.5%	Lee	1,059	3.2%
Black Hawk	2,930	3.2%	Linn	2,640	2.4%
Boone	686	3.3%	Louisa	296	3.8%
Bremer	190	1.3%	Lucas	219	3.4%
Buchanan	818	5.3%	Lyon	95	3.5%
Buena Vista	439	3.5%	Madison	282	2.7%
Butler	188	1.6%	Mahaska	911	6.3%
Calhoun	196	2.2%	Marion	462	2.1%
Carroll	313	2.5%	Marshall	795	2.7%
Cass	599	6.1%	Mills	369	3.0%
Cedar	155	1.7%	Mitchell	211	3.7%
Cerro Gordo	1,132	4.3%	Monona	350	3.8%
Cherokee	555	6.1%	Monroe	139	2.4%
Chickasaw	158	2.1%	Montgomery	559	7.0%
Clarke	223	3.5%	Muscatine	957	3.4%
Clay	388	3.9%	O'Brien	333	3.7%
Clayton	344	3.5%	Osceola	75	2.8%
Clinton	1,982	5.4%	Page	1,444	15.8%
Crawford	476	5.6%	Palo Alto	304	4.4%
Dallas	772	3.4%	Plymouth	533	3.0%

Davis	420	7.2%	Pocahontas	92	1.7%
Decatur	261	5.0%	Polk	13,920	5.3%
Delaware	212	2.2%	Pottawattamie	1543	3.7%
Des Moines	1,883	5.0%	Poweshiek	540	3.5%
Dickinson	288	3.3%	Ringgold	105	2.4%
Dubuque	1,830	3.1%	Sac	268	2.6%
Emmet	232	4.0%	Scott	3,620	3.8%
Fayette	363	2.7%	Shelby	175	2.3%
Floyd	249	2.2%	Sioux	947	5.5%
Franklin	227	3.6%	Story	1,040	2.5%
Fremont	325	8.8%	Tama	349	2.6%
Greene	303	4.4%	Taylor	143	4.4%
Grundy	107	1.4%	Union	235	2.4%
Guthrie	279	3.3%	Van Buren	240	3.6%
Hamilton	319	2.3%	Wapello	852	2.8%
Hancock	232	3.2%	Warren	621	2.5%
Hardin	395	2.6%	Washington	624	4.0%
Harrison	194	2.9%	Wayne	294	4.9%
Henry	408	3.0%	Webster	931	2.8%
Howard	195	5.4%	Winnebago	150	2.8%
Humboldt	176	2.2%	Winneshiek	198	3.1%
Ida	206	3.2%	Woodbury	4,237	5.7%
Iowa	170	1.8%	Worth	138	3.7%

Jackson	418	3.1%	Wright	527	4.9%
Jasper	693	2.6%			

Table 5B) Total Number and Percent of All ER Visits by Uninsured Patients during 2005-2006 by County of Residence

County	Number	Percent	County	Number	Percent
Adair	174	4.7%	Jasper	2,018	10.5%
Adams	222	12.6%	Jefferson	932	13.2%
Allamakee	757	14.7%	Johnson	7238	12.3%
Appanoose	1,323	11.9%	Jones	1,211	10.4%
Audubon	249	9.2%	Keokuk	864	12.6%
Benton	984	8.5%	Kossuth	579	9.3%
Black Hawk	12,238	16.1%	Lee	5,233	14.8%
Boone	2,478	13.4%	Linn	13,798	14.1%
Bremer	783	6.7%	Louisa	1,094	18.3%
Buchanan	1,058	9.4%	Lucas	420	8.2%
Buena Vista	917	9.6%	Lyon	193	6.5%
Butler	514	7.2%	Madison	662	8.4%
Calhoun	494	8.9%	Mahaska	2,333	16.0%
Carroll	567	10.4%	Marion	1,554	8.2%
Cass	689	9.4%	Marshall	3,925	14.0%
Cedar	605	10.0%	Mills	572	10.5%
Cerro Gordo	3,562	11.9%	Mitchell	379	7.3%
Cherokee	607	8.9%	Monona	541	9.1%

Chickasaw	424	6.5%	Monroe	543	9.0%
Clarke	842	12.7%	Montgomery	942	10.8%
Clay	1,103	11.4%	Muscatine	6,506	24.9%
Clayton	466	7.2%	O'Brien	506	8.6%
Clinton	2,303	13.3%	Osceola	211	8.6%
Crawford	919	9.5%	Page	2,394	18.9%
Dallas	1,803	10.7%	Palo Alto	685	11.6%
Davis	525	10.6%	Plymouth	959	8.4%
Decatur	615	11.4%	Pocahontas	401	9.1%
Delaware	722	7.1%	Polk	26,713	13.0%
Des Moines	6,047	16.5%	Pottawattamie	10,117	17.8%
Dickinson	970	11.5%	Poweshiek	2,362	15.6%
Dubuque	7,181	13.4%	Ringgold	208	7.3%
Emmet	600	7.9%	Sac	433	7.4%
Fayette	1,452	10.1%	Scott	18,567	17.1%
Floyd	277	3.0%	Shelby	444	6.5%
Franklin	624	11.6%	Sioux	874	7.4%
Fremont	607	16.1%	Story	3,932	12.2%
Greene	906	14.6%	Tama	989	11.0%
Grundy	433	8.7%	Taylor	305	11.2%
Guthrie	529	8.4%	Union	1,105	12.7%
Hamilton	1,065	12.1%	Van Buren	255	4.7%
Hancock	380	6.8%	Wapello	4,389	12.9%

Hardin	1,342	13.2%	Warren	1,084	8.4%
Harrison	899	10.8%	Washington	1,658	12.5%
Henry	2,194	15.0%	Wayne	421	9.7%
Howard	808	14.2%	Webster	4,158	14.7%
Humboldt	552	8.1%	Winnebago	301	8.9%
Ida	436	9.1%	Winneshiek	829	8.9%
Iowa	695	7.7%	Woodbury	10,881	18.3%
Jackson	719	6.7%	Worth	316	10.0%

Table 5C) Total Number and Percent of All Ambulatory Surgeries by Uninsured Patients during 2005-2006 by County of Residence

County	Number	Percent	County	Number	Percent
Adair	16	1.0%	Jasper	175	1.6%
Adams	20	1.9%	Jefferson	85	2.1%
Allamakee	47	2.9%	Johnson	971	2.0%
Appanoose	78	1.7%	Jones	63	1.2%
Audubon	28	1.5%	Keokuk	101	2.2%
Benton	119	1.7%	Kossuth	100	2.3%
Black Hawk	813	1.9%	Lee	209	1.4%
Boone	194	2.5%	Linn	639	1.4%
Bremer	111	1.3%	Louisa	127	2.9%
Buchanan	148	2.0%	Lucas	37	1.6%
Buena Vista	76	1.6%	Lyon	24	2.1%
Butler	72	1.3%	Madison	28	0.9%

Calhoun	34	1.0%	Mahaska	392	5.7%
Carroll	77	2.0%	Marion	86	0.9%
Cass	46	1.6%	Marshall	180	1.6%
Cedar	100	1.8%	Mills	28	1.2%
Cerro Gordo	87	0.9%	Mitchell	26	1.2%
Cherokee	80	2.3%	Monona	45	1.9%
Chickasaw	45	1.2%	Monroe	28	1.3%
Clarke	32	1.7%	Montgomery	38	1.4%
Clay	54	1.1%	Muscatine	987	6.8%
Clayton	43	1.3%	O'Brien	42	1.1%
Clinton	166	1.8%	Osceola	13	1.1%
Crawford	70	2.0%	Page	308	7.7%
Dallas	89	1.3%	Palo Alto	109	3.8%
Davis	56	2.3%	Plymouth	53	0.9%
Decatur	41	2.0%	Pocahontas	32	1.3%
Delaware	59	1.3%	Polk	1030	1.5%
Des Moines	321	1.6%	Pottawattamie	313	1.9%
Dickinson	74	1.9%	Poweshiek	309	5.0%
Dubuque	237	1.4%	Ringgold	17	0.9%
Emmet	33	1.5%	Sac	36	1.1%
Fayette	139	2.3%	Scott	725	2.6%
Floyd	37	1.0%	Shelby	33	1.3%
Franklin	22	0.8%	Sioux	89	1.2%

Fremont	67	4.1%	Story	158	0.8%
Greene	45	1.5%	Tama	115	1.9%
Grundy	42	1.0%	Taylor	23	1.7%
Guthrie	54	2.1%	Union	26	1.0%
Hamilton	38	0.8%	Van Buren	44	1.5%
Hancock	17	0.6%	Wapello	243	2.0%
Hardin	65	1.1%	Warren	83	1.1%
Harrison	46	1.8%	Washington	222	2.2%
Henry	115	1.4%	Wayne	27	1.5%
Howard	119	6.7%	Webster	138	1.2%
Humboldt	38	1.2%	Winnebago	14	0.7%
Ida	43	1.9%	Winneshiek	100	3.2%
Iowa	68	1.1%	Woodbury	439	1.9%
Jackson	80	1.8%	Worth	7	0.5%

Table 6 shows the number and percent of patients without insurance for the three study groups according to specific hospital characteristics, including whether the hospital was a critical access hospital, whether the hospital was a major teaching hospital, and according to ownership category. As shown in the table, critical access hospitals had higher proportions of admissions and ambulatory surgeries without insurance, but lower proportions of emergency rooms visits. Teaching hospitals had had lower proportions of admissions and emergency room visits without insurance, but higher proportions of ambulatory surgeries. Government-owned hospitals had the highest proportions of uninsured admissions and ambulatory surgeries, but the lowest proportion of emergency room visits.

Table 6) Number and Percent of Uninsured Patients According to Hospital Characteristics

	Acute Hospitalizations (2001-2006)		ER Visits (2005-2006)		Ambulatory Surgeries (2005-2006)	
Characteristic	***Uninsured Admissions (All Admissions)***	***Percent***	***Uninsured Visits (All Visits)***	***Percent***	***Uninsured Visits (All Visits)***	***Percent***
Critical Access						
- Yes	11,233 (228,512)	4.9%	50,132 (468,806)	10.7%	2,882 (130,569)	2.2%
- No	59,443 (1,659,099)	3.6%	165,111 (1,172,552)	14.1%	10,862 (617,743)	1.8%
Major Teaching						
- Yes	6,035 (179,325)	3.4%	12,764 (140,029)	9.1%	4,068 (164,739)	2.5%
- No	64,641 (1,708,286)	3.8%	202,479 (1,501,329)	13.5%	9,676 (583,573)	1.7%
Ownership						
- Church	23,539 (590,064)	4.0%	53,501 (390,092)	13.7%	3,005 (199,484)	1.5%
- Government	22,863 (461,256)	5.0%	60,868 (502,964)	12.1%	6,223 (268,568)	2.3%
- Other Not-For-Profit	24,274 (836,291)	2.9%	100,874 (748,302)	13.5%	4,516 (280,260)	1.6%

Tables 7A, 7B, and 7C show the 50 most common diagnoses or procedures among uninsured patients for acute hospitalizations, ER visits, and ambulatory surgeries, and the proportions of all uninsured visits that were accounted by the diagnosis.

For hospitalized patients (Table 7A, below), normal newborns accounted for nearly 15% of all admissions by uninsured patients, while the 50 top DRGs (out of the more than 500 total DRGs) accounted for roughly 65% of all admissions by uninsured patients.

Table 7A) 50 Most Common DRGs of Uninsured Hospitalized Patients during 2001-2006

DRG	Number	Percent	DRG	Number	Percent
391 NORMAL NEWBORN	10,902	15.4%	125 CIRCULATORY DISORDERS EXCEPT AMI, W CARD CATH W/O COMPLEX DIAG	502	0.7%
373 VAGINAL DELIVERY W/O COMPLICATING DIAGNOSES	4,155	5.9%	372 VAGINAL DELIVERY W COMPLICATING DIAGNOSES	501	0.7%
143 CHEST PAIN	1,610	2.3%	97 BRONCHITIS & ASTHMA AGE >17 W/O CC	493	0.7%
449 POISONING & TOXIC EFFECTS OF DRUGS AGE >17 W CC	1,432	2.0%	389 FULL TERM NEONATE W MAJOR PROBLEMS	457	0.6%
390 NEONATE W OTHER SIGNIFICANT PROBLEMS	1,375	1.9%	383 OTHER ANTEPARTUM DIAGNOSES W MEDICAL COMPLICATIONS	445	0.6%
182 ESOPHAGITIS, GASTROENT & MISC DIGEST DISORDERS AGE >17 W CC	1,178	1.7%	296 NUTRITIONAL & MISC METABOLIC DISORDERS AGE >17 W CC	438	0.6%
204 DISORDERS OF PANCREAS EXCEPT MALIGNANCY	1,144	1.6%	91 SIMPLE PNEUMONIA & PLEURISY AGE 0-17	435	0.6%
89 SIMPLE PNEUMONIA & PLEURISY AGE >17 W CC	1,124	1.6%	90 SIMPLE PNEUMONIA & PLEURISY AGE >17 W/O CC	423	0.6%

183 ESOPHAGITIS, GASTROENT & MISC DIGEST DISORDERS AGE >17 W/O CC	1,103	1.6%	494 LAPAROSCOPIC CHOLECYSTECTOMY W/O C.D.E. W/O CC	420	0.6%
371 CESAREAN SECTION W/O CC	1,085	1.5%	25 SEIZURE & HEADACHE AGE >17 W/O CC	410	0.6%
523 ALC/DRUG ABUSE OR DEPEND W/O REHABILITATION THERAPY W/O CC	1,060	1.5%	98 BRONCHITIS & ASTHMA AGE 0-17	409	0.6%
450 POISONING & TOXIC EFFECTS OF DRUGS AGE >17 W/O CC	874	1.2%	324 URINARY STONES W/O CC	406	0.6%
127 HEART FAILURE & SHOCK	780	1.1%	122 CIRCULATORY DISORDERS W AMI W/O MAJOR COMP, DISCHARGED ALIVE	379	0.5%
88 CHRONIC OBSTRUCTIVE PULMONARY DISEASE	743	1.1%	320 KIDNEY & URINARY TRACT INFECTIONS AGE >17 W CC	374	0.5%
295 DIABETES AGE 0-35	733	1.0%	388 PREMATURITY W/O MAJOR PROBLEMS	364	0.5%
521 ALCOHOL/DRUG ABUSE OR DEPENDENCE W CC	676	1.0%	24 SEIZURE & HEADACHE AGE >17 W CC	359	0.5%
167 APPENDECTOMY W/O COMPLICATED PRINCIPAL DIAG W/O CC	673	1.0%	202 CIRRHOSIS & ALCOHOLIC HEPATITIS	346	0.5%
294 DIABETES AGE >35	660	0.9%	138 CARDIAC ARRHYTHMIA & CONDUCTION DISORDERS W CC	336	0.5%

278 CELLULITIS AGE >17 W/O CC	637	0.9%	416 SEPTICEMIA AGE >17	334	0.5%
243 MEDICAL BACK PROBLEMS	633	0.9%	430 PSYCHOSES	334	0.5%
359 UTERINE & ADNEXA PROC FOR NON-MALIGNANCY W/O CC	619	0.9%	385 NEONATES, DIED OR TRANSFERRED TO ANOTHER ACUTE CARE FACILITY	331	0.5%
174 G.I. HEMORRHAGE W CC	604	0.9%	148 MAJOR SMALL & LARGE BOWEL PROCEDURES W CC	326	0.5%
14 INTRACRANIAL HEMORRHAGE OR CEREBRAL INFARCTION	546	0.8%	321 KIDNEY & URINARY TRACT INFECTIONS AGE >17 W/O CC	325	0.5%
277 CELLULITIS AGE >17 W CC	528	0.7%	316 RENAL FAILURE	319	0.5%
219 LOWER EXTREM & HUMER PROC EXCEPT HIP,FOOT,FEMUR AGE >17 W/O CC	512	0.7%	370 CESAREAN SECTION W CC	319	0.5%

For ER patients (Table 7B, below), superficial injuries and bruises and sprains and strains accounted for nearly 13% of all admissions by uninsured patients, while the 50 top Clinical Classification diagnoses (out of the more than 250 Clinical Classification diagnoses) accounted for roughly 86% of all admissions by uninsured patients.

Table 7B) 50 Most Common Clinical Classification Diagnoses of Uninsured ER Visits during 2005-2006

CCD	Number	Percent	CCD	Number	Percent
239 SUPERFICIAL INJURY; CONTUSION	13,621	6.3%	66 ALCOHOL-RELATED MENTAL DISORDERS	2,599	1.1%

232 SPRAINS AND STRAINS	13,570	6.3%	7 VIRAL INFECTION	2,437	1.1%
126 OTHER UPPER RESPIRATORY INFECTIONS	11,162	5.2%	72 ANXIETY; SOMATOFORM; DISSOCIATIVE; AND PERSONALITY DISORDERS	2,370	0.9%
251 ABDOMINAL PAIN	10,307	4.8%	90 INFLAMMATION; INFECTION OF EYE (EXCEPT THAT CAUSED BY TUBERCULOSIS OR SEXUALLY TRANSMITTED DISEASE)	1,993	0.8%
236 OPEN WOUNDS OF EXTREMITIES	9,609	4.5%	181 OTHER COMPLICATIONS OF PREGNANCY	1,821	0.8%
84 HEADACHE; INCLUDING MIGRAINE	8,151	3.8%	155 OTHER GASTROINTESTINAL DISORDERS	1,767	0.8%
136 DISORDERS OF TEETH AND JAW	7,154	3.3%	94 OTHER EAR AND SENSE ORGAN DISORDERS	1,730	0.8%
205 SPONDYLOSIS; INTERVERTEBRAL DISC DISORDERS; OTHER BACK PROBLEMS	7,114	3.3%	200 OTHER SKIN DISORDERS	1,684	0.8%
235 OPEN WOUNDS OF HEAD; NECK; AND TRUNK	6,595	3.1%	230 FRACTURE OF LOWER LIMB	1,679	0.8%
244 OTHER INJURIES AND CONDITIONS DUE TO EXTERNAL CAUSES	6,033	2.8%	160 CALCULUS OF URINARY TRACT	1,647	0.7%
102 NONSPECIFIC CHEST PAIN	5,625	2.6%	83 EPILEPSY; CONVULSIONS	1,555	0.7%

197 SKIN AND SUBCUTANEOUS TISSUE INFECTIONS	5,332	2.5%	93 CONDITIONS ASSOCIATED WITH DIZZINESS OR VERTIGO	1,401	0.6%
133 OTHER LOWER RESPIRATORY DISEASE	4,194	1.9%	122 PNEUMONIA (EXCEPT THAT CAUSED BY TUBERCULOSIS OR SEXUALLY TRANSMITTED DISEASE)	1,286	0.6%
159 URINARY TRACT INFECTIONS	4,047	1.9%	246 FEVER OF UNKNOWN ORIGIN	1,277	0.6%
211 OTHER CONNECTIVE TISSUE DISEASE	3,893	1.8%	175 OTHER FEMALE GENITAL DISORDERS	1,245	0.6%
92 OTITIS MEDIA AND RELATED CONDITIONS	3,482	1.6%	245 SYNCOPE	1,222	0.6%
229 FRACTURE OF UPPER LIMB	3,414	1.6%	240 BURNS	1,216	0.6%
204 OTHER NON-TRAUMATIC JOINT DISORDERS	3,254	1.5%	140 GASTRITIS AND DUODENITIS	1,185	0.6%
128 ASTHMA	3,072	1.4%	95 OTHER NERVOUS SYSTEM DISORDERS	1,185	0.5%
253 ALLERGIC REACTIONS	3,050	1.4%	134 OTHER UPPER RESPIRATORY DISEASE	1,182	0.5%
125 ACUTE BRONCHITIS	2,998	1.4%	67 SUBSTANCE-RELATED MENTAL DISORDERS	1,149	0.5%
154 NONINFECTIOUS GASTROENTERITIS	2,755	1.3%	182 HEMORRHAGE DURING PREGNANCY; ABRUPTIO PLACENTA; PLACENTA PREVIA	1,132	0.5%

250 NAUSEA AND VOMITING	2,680	1.2%	171 MENSTRUAL DISORDERS	1,111	0.5%
127 CHRONIC OBSTRUCTIVE PULMONARY DISEASE AND BRONCHIECTASIS	2,675	1.2%	106 CARDIAC DYSRHYTHMIAS	1,105	0.5%
74 OTHER MENTAL CONDITIONS	2,667	1.2%	124 ACUTE AND CHRONIC TONSILLITIS	1,099	0.5%

For ambulatory surgery patients (Table 7C, below), the 50 top Clinical Classification procedures (out of the more than 250 procedures) accounted for roughly 79% of all admissions by uninsured patients.

Table 7C) 50 Most Common Clinical Classification Procedures of Uninsured Ambulatory Surgeries during 2005-2006

CCD	Number	Percent	CCD	Number	Percent
205 SPONDYLOSIS; INTERVERTEBRAL DISC DISORDERS; OTHER BACK PROBLEMS	681	5.0%	257 OTHER AFTERCARE	188	1.4%
47 OTHER AND UNSPECIFIED BENIGN NEOPLASM	557	4.1%	230 FRACTURE OF LOWER LIMB	184	1.3%
89 BLINDNESS AND VISION DEFECTS	453	3.3%	197 SKIN AND SUBCUTANEOUS TISSUE INFECTIONS	167	1.2%
149 BILIARY TRACT DISEASE	407	3.0%	240 BURNS	159	1.2%
143 ABDOMINAL HERNIA	399	2.9%	95 OTHER NERVOUS SYSTEM DISORDERS	156	1.1%

229 FRACTURE OF UPPER LIMB	372	2.7%	101 CORONARY ATHEROSCLEROSIS AND OTHER HEART DISEASE	143	1.0%
136 DISORDERS OF TEETH AND JAW	371	2.7%	146 DIVERTICULOSIS AND DIVERTICULITIS	141	1.0%
155 OTHER GASTROINTESTINAL DISORDERS	347	2.5%	217 OTHER CONGENITAL ANOMALIES	140	1.0%
138 ESOPHAGEAL DISORDERS	319	2.3%	171 MENSTRUAL DISORDERS	138	1.0%
86 CATARACT	310	2.3%	232 SPRAINS AND STRAINS	136	1.0%
211 OTHER CONNECTIVE TISSUE DISEASE	309	2.2%	147 ANAL AND RECTAL CONDITIONS	127	0.9%
153 GASTROINTESTINAL HEMORRHAGE	273	2.0%	228 SKULL AND FACE FRACTURES	127	0.9%
225 JOINT DISORDERS AND DISLOCATIONS; TRAUMA-RELATED	271	2.0%	236 OPEN WOUNDS OF EXTREMITIES	127	0.9%
258 OTHER SCREENING FOR SUSPECTED CONDITIONS (NOT MENTAL DISORDERS OR INFECTIOUS DISEASE)	261	1.9%	237 COMPLICATION OF DEVICE; IMPLANT OR GRAFT	124	0.9%
175 OTHER FEMALE GENITAL DISORDERS	251	1.8%	133 OTHER LOWER RESPIRATORY DISEASE	122	0.9%
167 NONMALIGNANT BREAST CONDITIONS	240	1.7%	163 GENITOURINARY SYMPTOMS AND ILL-DEFINED CONDITIONS	113	0.8%

124 ACUTE AND CHRONIC TONSILLITIS	235	1.7%	106 CARDIAC DYSRHYTHMIAS	108	0.8%
251 ABDOMINAL PAIN	230	1.7%	87 RETINAL DETACHMENT; DEFECTS; VASCULAR OCCLUSION; AND RETINOPATHY	104	0.8%
102 NONSPECIFIC CHEST PAIN	225	1.6%	134 OTHER UPPER RESPIRATORY DISEASE	100	0.7%
140 GASTRITIS AND DUODENITIS	213	1.5%	120 HEMORRHOIDS	99	0.7%
204 OTHER NON-TRAUMATIC JOINT DISORDERS	212	1.5%	96 HEART VALVE DISORDERS	99	0.7%
92 OTITIS MEDIA AND RELATED CONDITIONS	208	1.5%	181 OTHER COMPLICATIONS OF PREGNANCY	92	0.7%
200 OTHER SKIN DISORDERS	197	1.4%	231 OTHER FRACTURES	84	0.6%
160 CALCULUS OF URINARY TRACT	195	1.4%	176 CONTRACEPTIVE AND PROCREATIVE MANAGEMENT	83	0.6%
259 RESIDUAL CODES; UNCLASSIFIED	194	1.4%	91 OTHER EYE DISORDERS	83	0.6%

Tables 8A, 8B, and 8C show differences in mean length of stay, charges, and costs in patients with and without health insurance. The tables also show the results of analyses adjusting the differences in length of stay, charges, and costs for differences in age, gender, race, and diagnosis.

For hospitalized patients (Table 8A, below), uninsured patients had a mean length of stay that was roughly 1 day less than insured patients. After adjusting for age, race, gender, and diagnosis, the difference was only 0.3 days, although the difference was still statistically significant. Similar results were seen for analyses of charges and costs. For costs, mean costs

were $1764 lower in uninsured patients. However, differences in adjusted costs were substantially smaller ($237 lower in uninsured patients).

Table 8A) Mean Length of Stay, Total Charges, and Total Costs of Uninsured and Insured Hospitalized Patients

	Uninsured	Insured	Difference (t test)	Adjusted Difference*
Mean Length of Stay (SD), days	3.1 (8.7)	4.1 (6.8)	-1.0 (p<.0001)	- 0.3 (p<.0001)
Mean Charges (SD), $	9,061 (15,718)	13,279 (21,309)	-4,218 (p<.0001)	- 921 (p<.0001)
Mean Costs (SD), $	4,165 (6,833)	5,929 (9,106)	-1,764 (p<.0001)	- 237 (p<.0001)

** Adjusted for age, gender, race, and diagnosis*

For ER patients (Table 8B, below), uninsured patients had mean costs that were $97 lower than insured patients. This difference declined to $36 in adjusted analyses.

Table 8B) Mean Total Charges and Total Costs of Uninsured and Insured ER Visits

	Uninsured	Insured	Difference (t test)	Adjusted Difference*
Mean Charges (SD), $	939 (1,230)	1,120 (1,485)	-181 (p<.0001)	-108 (p<.0001)
Mean Costs (SD), $	463 (595)	560 (719)	-97 (p<.0001)	-36 (p<.0001)

** Adjusted for age, gender, race, and diagnosis*

For ambulatory surgery patients (Table 8C, below), uninsured patients had mean costs that were $22 higher than insured patients. However, this difference was $50 lower in adjusted analyses.

Table 8C) Mean Total Charges and Total Costs of Uninsured and Insured Ambulatory Surgeries

	Uninsured	Insured	Difference	Adjusted Difference*
Mean Charges (SD), $	3,611 (4,008)	3,732 (4,291)	-121 (p=.0005)	-373 (p<.0001)
Mean Costs (SD), $	1,796 (1,896)	1,774 (1,931)	22 (p=.19)	-50 (p=.0003)

** Adjusted for age, gender, race, and diagnosis*

Table 9A shows the total costs of care according to type of health insurance for hospitalized patients for individual years. For each year, Medicare patients incurred the highest amount of costs. Costs associated with care of uninsured patients were relatively stable between 2001 and 2004 and then increased substantially in 2005 and 2006. Across all six years the total costs associated with the care of uninsured patients was $294.1 million.

Table 9A) Total Costs of Care (Million $) for Acute Hospitalizations for All patients by Insurance Type for Individual Years

	2001	2002	2003	2004	2005	2006
Blue Cross / Other Commercial	503.9	552.5	584.9	621.5	676.7	722.0
Medicaid	118.4	138.8	151.8	171.7	212.6	234.7
Medicare	815.8	885.7	919.8	1017.8	1104.0	1122.3
Other Government	34.5	39.7	34.9	37.9	34.0	32.5
Uninsured	45.2	49.5	41.0	46.6	51.1	60.7

Table 9B shows the percent of all costs incurred by patients with different forms of insurance. The proportion of costs attributable to uninsured patients ranged form 2.4% in 2003 to 3.0% in 2001 and 2002.

Table 9B) Percent of Total Costs of Care for Acute Hospitalizations Attributable to Individual Types of Insurance for Individual Years

	2001	2002	2003	2004	2005	2006
Blue Cross / Other Commercial	33.2%	33.2%	33.8%	32.8%	32.6%	33.2%
Medicaid	7.8%	8.3%	8.8%	9.1%	10.2%	10.8%
Medicare	53.7%	53.2%	53.1%	53.7%	53.1%	51.7%
Other Government	2.3%	2.4%	2.0%	2.0%	1.6%	1.5%
Uninsured	3.0%	3.0%	2.4%	2.5%	2.5%	2.8%

Table 10A shows the total costs of care according to type of health insurance for ER visits and ambulatory surgeries for 2005 and 2006. For both years, patients with Blue Cross and other commercial insurance incurred the highest amount of costs for both study groups. Costs associated with ER care of uninsured patients amounted to $99.7 million in these two years, while costs of ambulatory surgeries amounted to $24.5 million.

Table 10A) Total Costs of Care (Million $) for ER Visits and Ambulatory Surgeries for All patients by Insurance Type for Individual Years

ER Visits	2005	2006	Ambulatory Surgeries	2005	2006
Blue Cross / Other Commercial	172.7	194.8	**Blue Cross / Other Commercial**	346.1	350.7
Medicaid	63.1	74.6	**Medicaid**	45.0	50.6
Medicare	122.0	141.4	**Medicare**	230.8	233.6
Other Government	12.8	16.4	**Other Government**	23.3	22.1
Uninsured	**46.7**	**53.0**	**Uninsured**	**13.1**	**11.4**

Table 10B shows the percent of all costs incurred by patients with different forms of insurance. The proportion of costs attributable to uninsured patients for emergency room care was roughly 11% in each year; the proportions were roughly 2% in each year for ambulatory surgery.

Table 10B) Percent of Total Costs of Care for ER Visits and Ambulatory Surgeries Attributable to Individual Types of Insurance for Individuals Years

ER Visits	2005	2006	Ambulatory Surgeries	2005	2006
Blue Cross / Other Commercial	41.4%	40.6%	**Blue Cross / Other Commercial**	52.6%	52.5%
Medicaid	15.1%	15.5%	**Medicaid**	6.8%	7.6%
Medicare	29.2%	29.4%	**Medicare**	35.1%	34.9%
Other Government	3.1%	3.4%	**Other Government**	3.5%	3.3%
Uninsured	**11.2%**	**11.0%**	**Uninsured**	**2.0%**	**1.7%**

To estimate the amount of charity care (i.e., cost of care – amount collected from patients), simulations were done, assuming various collection rate scenarios. The scenarios ranged from a 5% collection rate to a 50% collection rate.

Table 11A shows estimates of charity care for acute hospitalization for individual years. The top row shows the total cost of care to uninsured patients, while the subsequent rows show costs under different scenarios.

Table 11A: Estimates of Charity Care (in million $) Provided by Hospitals for Acute Hospitalizations for Individual Years under Various Collection Rate Scenarios

	2001	2002	2003	2004	2005	2006
Total Uninsured Costs	**$45.2 M**	**$49.5 M**	**$41.0 M**	**$46.6 M**	**$51.1 M**	**$60.7 M**
Amount of Charity Care at ….						
- 5% collection rate	42.9	47.0	39.0	44.3	48.5	57.7
- 10% collection rate	40.7	44.6	36.9	41.9	46.0	54.6
- 15% collection rate	38.4	42.1	34.9	39.6	43.4	51.6
- 25% collection rate	33.9	37.1	30.8	35.0	38.3	45.5
- 50% collection rate	22.6	24.8	20.5	23.3	25.6	30.4

Table 11B: Estimates of Charity Care (in million $) Provided by Hospitals for ER Visits and Ambulatory Surgeries for Individual Years under Various Collection Rate Scenarios

	2005	2006		2005	2006
	Emergency Room			***Ambulatory Surgery***	
Total Uninsured Costs	**$46.7 M**	**$53.0 M**		**$13.1 M**	**$11.4 M**
Amount of Charity Care at ….					
- 5% collection rate	44.4	50.4		12.4	10.8
- 10% collection rate	42.0	47.7		11.8	10.3
- 15% collection rate	39.7	45.1		11.1	9.7
- 25% collection rate	35.0	39.8		9.8	8.6
- 50% collection rate	23.4	26.5		6.6	5.7

Table 12 shows rates of complications experienced by hospitalized patients with and without insurance. For most complications, differences were relatively small and not significantly different. For two of the 20 complications (decubitus ulcers and postoperative pulmonary embolus or deep venous thrombosis), uninsured patients had lower rates of complications.

Table 12) Rates of Hospital-Acquired Complications in Uninsured and Insured Hospitalized Patients during 2001-2006

Complication (*Number of patients at risk for the complication)*	**Uninsured (N=70,676)**	**Insured (N=1,816,935)**	**Difference**	**P Value (chi-square test)**
Complications of Anesthesia (N=517,320) *	23 (0.2%)	874 (0.2%)	0.0%	.87
Death in Low Mortality DRGs (N=463,824) *	7 (0.0%)	312 (0.1%)	-0.1%	.09

Decubitus Ulcer (N=361,947) *	33 (0.4%)	3,559 (1.0%)	-0.6%	<.0001
Failure to Rescue (N=35,459) *	150 (10.0%)	3,429 (10.1%)	-0.1%	.94
Foreign Body Left in During Proc (N=1,576,922) *	4 (0.0%)	97 (0.0%)	0.0%	.77
Iatrogenic Pneumothorax (N=1,273,541) *	14 (0.0%)	595 (0.1%)	-0.1%	.10
Infection due to Medical Care (N=1,062,023) *	35 (0.1%)	1,154 (0.1%)	0.0%	.66
Postoperative Hip Fracture (N=285,537) *	0 (0.0%)	20 (0.0%)	0.0%	.46
Postop Hemorrhage or Hematoma (N=452,314) *	20 (0.2%)	1,000 (0.2%)	0.0%	.30
Postop Physio Metabol Derangement (N=270,844) *	1 (0.0%)	29 (0.0%)	0.0%	.45
Postop Respiratory Failure (N=214,242) *	16 (0.5%)	1,043 (0.5%)	0.0%	.75
Postoperative PE or DVT (N=451,701) *	43 (0.4%)	2,431 (0.6%)	-0.2%	.02
Postoperative Sepsis (N=72,742) *	8 (0.9%)	538 (0.8%)	0.1%	.68
Postoperative Wound Dehiscence (N=88,465)	0 (0.0%)	0 (0.0%)	0.0%	----
Accidental Puncture / Laceration (N=1,346,079) *	104 (0.2%)	4,425 (0.3%)	-0.1%	<.0001
Transfusion Reaction (N=1,576,944) *	0 (0.0%)	9 (0.0%)	0.0%	.57

Birth Trauma - Injury to Neonate (N=214,203) *	63 (0.5%)	755 (0.4%)	0.1%	.08
OB Trauma - Vaginal w Instrument (N=18,726) *	100 (21.3%)	3,912 (21.4%)	-0.1%	.96
OB Trauma – Vaginal w/o Instrument (N=138,979) *	209 (4.8%)	6,951 (5.2%)	-0.4%	.32
OB Trauma – C-Section (N=54,632) *	8 (0.6%)	216 (0.4%)	0.2%	.34

* *Note that the number of patients at risk for individual complications differed. The occurrence and number of at risk patients were determined using algorithms available through the Agency for Healthcare Research and Quality*

Table 13 shows rates of discharge destination and mortality for hospitalized patients with and without insurance. Uninsured patients were more likely to be home and were much less likely to be discharged to another inpatient facility or to be discharged with home health care. These differences likely reflect the younger ages of uninsured patients. Uninsured patients also had lower rates of in-hospital mortality than insured patients.

Table 13) Rates of Individual Discharge Destinations and Mortality in Insured and Uninsured Hospitalized Patients during 2001-2006

Number (%)	Uninsured	Insured	Difference	P Value
Home or Self Care	59,627 (84.4%)	1,339,166 (73.7%)	10.7%	<.0001
Acute Care Hospital	3,208 (4.5%)	85,819 (4.7%)	-0.2%	.02
Other Inpatient Facility	1,874 (2.7%)	202,392 (11.1%)	-8.4%	<.0001
In-hospital Mortality	1,106 (1.6%)	37,049 (2.0%)	-0.4%	<.0001
Home Health Provider	1,801 (2.6%)	122,703 (6.8%)	-4.2%	<.0001
Left AMA	1,258 (1.8%)	3,955 (0.2%)	1.6%	<.0001
Other/Unknown	1,802 (2.6%)	25,851 (1.4%)	1.2%	<.0001

SUMMARY

The current analysis provides important new data on the potential magnitude of charity provided by Iowa hospitals. Using existing databases that include information on all patient encounters for acute hospital care, ER visits, and ambulatory surgeries, the analysis provides information on the epidemiology and magnitude of uncompensated care by Iowa hospitals. The analysis had several important strengths. First, it included patients from all Iowa hospitals over multiple years. Second, it provided estimates of the actual costs of care, as well as hospital charges, using cost to charge ratios in publicly available Medicare hospital cost reports. Third, it provides estimates of the variation in care to the uninsured provided by different types of hospitals and the diagnoses responsible for a majority of this care.

Key Findings

- Uninsured patients accounted for 3.7% of all hospital admissions, 13.1% of ER visits, and 1.8% of ambulatory surgeries in Iowa; these proportions have been relatively stable over time.

- Compared with patients with insurance, patients without insurance were more likely to be male and more likely to be black; patients without insurance were also younger, on average, than patients with insurance

- Uninsured patients were more likely to be admitted from an emergency room and less likely to be admitted based on physician referral compared with insured patients.

- The five counties with the highest percentage of uninsured inpatient admissions were Page (15.8%), Fremont (8.8%), Allamakee (7.8%), Davis (7.2%) and Montgomery (7.0%); the five counties with the highest number of uninsured inpatient admissions were Polk (13,920), Woodbury (4,237), Scott (3,620), Black Hawk (2,930) and Linn (2,640).

- The five counties with the highest percentage of uninsured ER visits were Muscatine (24.9%), Page (18.9%), Wright (18.9%), Woodbury (18.3%) and Louisa (18.3%); the five counties with the highest number of uninsured ER visits were Polk (26,713), Scott (18,567), Linn (13,798), Black Hawk (12,238) and Woodbury (10,881).

- The five counties with the highest percentage of uninsured ambulatory surgeries were Page (7.7%), Muscatine (6.8%), Howard (6.7%), Mahaska (5.7%) and Poweshiek (5.0%); the five counties with the highest number of uninsured ambulatory surgeries were Polk (1,030), Muscatine (987), Johnson (971), Black Hawk (813) and Scott (725).

- "Normal newborns" was the single most frequent DRG for uninsured admissions at 15%; approximately 13% of uninsured ER visits were due to superficial injury, contusions and sprains and strains, while back-related problems were the largest single classification for uninsured ambulatory surgeries (5%).

- Mean inpatient charges were $4,218 lower and mean inpatient costs were $1,764 lower for uninsured patients; after adjusting for age, gender, race and diagnosis mean inpatient

charges are $921 lower and mean inpatient costs were $237 lower for uninsured patients. Mean length of stay was 1 day less for uninsured patients; after adjusting for age, gender, race and diagnosis this difference was reduced to 0.3 days less for uninsured patients.

- Mean ER charges were $181 lower and mean ER costs were $97 lower for uninsured patients; after adjusting for age, gender, race and diagnosis mean ER charges were $108 lower and mean ER costs were $36 lower for uninsured patients.

- Mean ambulatory surgery charges were $121 lower and mean costs were $22 higher for uninsured patients; after adjusting for age, gender, race and diagnosis mean ambulatory surgery charges were $373 lower and mean ambulatory surgery costs were $50 lower for uninsured patients.

- In 2006, the costs incurred by Iowa hospitals in treating uninsured patients amounted to $61M for acute hospital care, $53M for ER care, and $11M for ambulatory surgical care; in 2005, these costs were $51M and $47M, and $13M, respectively.

- Costs associated with uninsured patients represented 2.6% of acute hospitalization costs, 11.1% of ER costs, and 1.8% of ambulatory surgery costs in Iowa.

- Uninsured inpatients were more likely to be discharged to home or self care compared with insured inpatients (84.4% vs. 73.7%) and were more apt to leave AMA (1.8% vs. 0.2%); uninsured inpatients were less likely to be discharged to another inpatient facility (2.7% vs. 11.1%) or to the care of a home health provider (2.6% vs. 6.8%), were slightly less likely to be discharged to an acute care hospital (4.5% vs. 4.7%); and uninsured inpatients were slightly less likely to experience in-hospital mortality (1.6% vs. 2.0%).

Potential Methodological Limitations

In interpreting the findings in this report, it is important to be cognizant of potential methodological limitations.

- First, the analysis only considered care delivered in acute care hospitals and did not consider care delivered in clinics, physicians' offices or in other settings. Thus, the findings under-estimate the true magnitude of care provided to patients without health insurance.

- Second, the charge data in the Iowa Hospital Association databases only included charges attributable to hospital expenditures and did not include professional services provided by physicians and other health care providers. Such charge data is usually billed separately from charges submitted by hospitals that are captured in the databases used in the analysis. The absence of practitioner charge data leads to further under-estimates of charity care.

- Third, the database used in this analysis did not include on patients who were hospitalized for HIV infection or for treatment of substance abuse. The lack of information on such patients may lead to further under-estimation of uncompensated care.

- Fourth, the amount of costs incurred by hospitals in caring for patients without insurance reflects both the costs of care provided minus the fees captured by hospitals from direct

patient billings. While it is likely that hospitals capture only a small fraction of these costs, the amount captured by hospitals is not included in the databases available to the project team. Such information could only be obtained directly from individual hospitals. The data presented in Tables 11A and 11B provide estimates of the range of the actual amount of hospital-based charity care, using a wide range of estimates of the proportion of costs captured directly from patients.

- Fifth, the estimates of actual hospital costs determined in this project were based on hospital charge data and cost to charge ratios submitted by hospitals to CMS. While the use of such ratios to generate estimates of costs from charge data is a widely accepted method, the accuracy of the ratios is unknown. In addition, the cost to charge data for hospitals in the annual CMS reports was incomplete across the years of the project for many hospitals and was entirely missing in some hospitals. In the latter cases, mean cost to charge ratios for all hospitals was used. Actual cost data determined from sophisticated hospital cost accounting systems may be available from some hospitals but is generally regarded as proprietary information.

- Lastly, while the analysis provides needed information on costs of care, the analysis does not examine other measures related to the access and appropriateness of care.

Conclusions

The current analysis sought to quantify the care provided by Iowa hospitals to Iowa residents without health insurance, and to characterize those patients relative to patients with health insurance. Uninsured patients tend to be younger than patients with insurance, and they are disproportionately male and black. The five counties with the highest percentages of uninsured hospitalizations are rural; two of the five counties with the highest percentages of uninsured ER visits and two of the five counties with the highest percentages of uninsured ambulatory surgeries are more urban.

Uninsured care constitutes the highest proportion of ER costs (11.1%), followed by acute hospitalization costs (2.6%) and ambulatory surgery costs (1.8%). However, uninsured hospitalizations are more costly overall: in 2006 the total cost for uninsured acute hospitalizations was $61 million, compared with $53 million for ER visits and $13 million for ambulatory surgery, and these numbers are likely underestimates. The relative proportion of uninsured hospitalizations was relatively stable from 2001 through 2006, but the cost of these hospitalizations has trended upwards commensurate with an overall increase in inpatient costs. Future research should attempt to further explicate the true economic costs to Iowa hospitals of caring for uninsured populations through surveys of the percentage of costs that are captured through patient billing.